OBSERVATION GUIDELINES FOR A TOTAL OZONE MAPPING SPECTROMETER (TOMS) IN GEOSYNCHRONOUS ORBIT

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The successful utilization of TOMS measurements in low earth orbit for the analysis of rapidly changing events has led to the consideration of a TOMS in geosynchronous orbit. This orbit should allow the proper selection of temporal and spatial resolutions that are specifically designed for these events plus the flexibility of selecting different sized areas and pointing the sensor to focus on the most interesting events. Separate temporal and spatial resolutions guidelines plus recommended areal coverage have been developed for tropical cyclones, jet streams, the interaction between strong convection and the environment, and the surveillance of volcanoes. It is also suggested that the most effective use of TOMS would be simultaneous flights with microwave and high spectral resolution infrared temperature profiles.

Table 1. GEOSTATIONARY OBSERVING GUIDELINES — TOMS

- SIMULTANEOUS FLIGHT WITH OTHER SENSORS FOR PROFILING
  - MICROWAVE
  - IR INTERFEROMETER
- FLEXIBLE POINTING AND AREA SIZE SELECTION
- RAPID (AND SOMETIMES SMALL) TEMPORAL CHANGES VERY IMPORTANT
- GENERAL PHILOSOPHY FOR RESEARCH — BETTER TO OVERDESIGN THAN UNDERDESIGN — DESIGN FOR EXTREMES
- MESOSCALE AND REGIONAL SCALE — HIGH SPATIAL AND TEMPORAL RESOLUTION —

PHENOMENON/FEATURE	TEMP. RES. (MIN.)	SPATIAL RES. (KM-AT NADIR)	COVERAGE (KM-AT NADIR)
HURRICANE			
• EYE AND IMMED. SURROUNDINGS (~3° OF CENTER)	5-10	5-10	500 × 500
• REST OF CYCLONE AND ENVIRONS	30	10-30	3000 × 3000
CONVECTION — ENVIRONMENT INTERACTIONS	5-10	≤10	1000 × 1000
JET STREAMS	10-30	10	1000 × 2000
VOLCANOES			
• INITIAL PHASE (FIRST 12 HRS.)	5-10	5-10	500 × 500
• LATER	30	10-30	3000 × 3000

- FULL DISK COVERAGE
  - ≤60 MIN FREQUENCY
  - 10-30 KM SPATIAL RESOLUTION